

**Commonwealth of Kentucky**  
**Division for Air Quality**  
***PERMIT STATEMENT OF BASIS***

Title V (draft/proposed) No. V-00-004

Hampshire Chemical Corporation

Owensboro, Kentucky

May 11, 2000

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Plant I.D. # 21-059-00155

Application Log # F936

Hampshire Chemical Corporation ("Hampshire") owns and operates a batch chemical manufacturing facility in Owensboro, Kentucky. This source is a major source for VOCs and HAPs. The primary activity at the Owensboro facility is the production of various latex polymers, which falls under SIC code 2821. There are five primary production processes at the facility. They are Butadiene Copolymers (COPOL), Polyvinylidene Chloride (DARAN), Acrylic Polymers (DAXAD), Polyurethane (HYPOL), and Polyvinyl Acetate (PVA). There is an experimental reactor, which produces 2,3-Dimethyl 2,3-Dinitrobutane (DMDNB). The facility also contains raw material and product storage tanks and a wastewater treatment facility. The emission points are described below:

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**SOURCE DESCRIPTION:**

Emission Points 01-06: Butadiene **Copolymers (COPOL)**

This process consists of emulsion polymerization of butadiene with other monomers such as styrene, acrylonitrile and various acrylates. Butadiene copolymers consist of wide variety of latex emulsions used for seed polymers, carpet backing, and paperboard coatings. Butadiene copolymers are produced in stainless steel reactors by batchwise and semi-batchwise emulsion polymerization.

**COMMENTS:**

The major emissions from this process are VOC and HAP emissions. This process comes under the provisions of 40 CFR 63, Subpart U *National Emission Standards for Hazardous Air Pollutant Emissions, Group 1 Polymers and Resins*. This source is an "Existing Affected Source," according to 40 CFR 63.480(a). The COPOL process is split into five major areas. They are Front-End process vents, Surge Control Vessels, Storage Vessels, Wastewater streams and Equipment leak provisions

In the Front-End process vents, there are Group 1 process vents and Group 2 process vents. The Group 1 process vents are ducted together and are routed to the Flare via a Surge Control Vessel. The Group 1 process vents are required to have the Flare as control equipment to reduce the organic emissions.

There are no Back-End process vents. If there were any, the Back-End process vents would be exempt at this source according to 40 CFR 63.493, as this source only produces liquid rubber product in a gas-phased polymerization reaction.

Surge control vessels collect the VOCs and HAPS vented and stripped from different processes. The discharge from these vessels continues through a compressor, the compressed gas vessel (T-42) to the flare. The Surge control vessel T-40 is required by Subpart U and H to have a closed-vent system that routes the organic vapors to the Flare.

There is one storage vessel (Acrylonitrile Tank, Group 2 Tank) which is subject to the requirements of 40 CFR 63, Subpart U in Storage Vessels area. There are no Group 1 storage tanks in this area.

There are ten Group 2 Wastewater streams in the Wastewater Streams area. There are no Group 1 wastewater streams.

40 CFR 63, Subpart U refers to 40 CFR 63, Subpart H for the Equipment Leak provisions. 40 CFR 63, Subpart H applies to the pipeline equipment and contains requirements such as Leak Detection and Repair (LDAR) program.

*Flares:*

40 CFR 63, Subpart U refers to 40 CFR 63, Subpart A for the requirements applicable to Flare. Regulation 401 KAR 63:015, *Flares* also applies to the flares. Pursuant to 40 CFR 63.11(b)(4), Flares shall be designed for and operated with no visible emissions, except for periods not exceeding a total of 5 minutes during any 2 consecutive hours. Pursuant to Regulation 401 KAR 63:015, Section 3, the opacity of visible emissions from each flare listed above shall not exceed 20% for more than 3 minutes in any one day. The compliance demonstration to meet both the above requirements is set as follows:

1. The permittee is required to perform the Method 22 testing for visible emissions for a period of 2 hours duration of each venting episode.
2. If visible emissions are observed during the venting episode, the permittee is required to perform Method 9-opacity test.

*Emission Factors and Emissions Calculations:*

Emissions are calculated from the batch processes based on a "Super Batch". The Super Batch approach is used to calculate the emissions from all the different process areas throughout the facility. Each product family (in this instance, COPOL) has several different specific products (e. g., 165L, 121L, 537LN, etc.), which in the production process emit different levels of the same pollutants. Each product family's Super Batch was constructed using the highest emission rate (in lbs/batch) of each particular pollutant among all the specific products throughout the product family. Potentials to emit were calculated by dividing 8760 hours/year by the product batch cycle time, then multiplying by the highest emission rate of each pollutant. This method is both conservative and flexible.

*Compliance with Equipment Leak provisions of 40 CFR 63, Subpart H:*

40 CFR 63.502(h), Notification of Compliance Status - The permittee was to have submitted the Notification of Compliance Status required by 40 CFR 63.182 (a)(2) and 40 CFR 63.182 (c) of Subpart H within 150 days of applicable compliance date as specified in 63.481 for the equipment leak provisions (July 31, 1997). The Notification however can be submitted as part of the Notification of Compliance Status required by 40 CFR 63.506(e)(5). The Notification of Compliance Status therefore shall be submitted by March 5, 2000. Hampshire however did not come into compliance with the equipment leak provisions by July 31, 1997. They have notified DAQ of noncompliance deficiencies relating to implementation of Leak Detection and Repair (LDAR) program for COPOL. Hampshire has proposed to be in full compliance with LDAR program by September 1999, but has not submitted any information to date.

**SOURCE DESCRIPTION:****Emission Point 07: Acrylic Polymers (DAXAD)**

DAXAD is a poly-methacrylate dispersing agent. DAXAD products are made in a stainless steel reactor by batchwise saponification and subsequent polymerization of methyl methacrylate or methacrylic acid. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of methyl methacrylate and methanol. DAXAD is normally produced in only one reactor train (Reactor 360 and associated equipment).

**Emission Points 08-11: Polyvinylidene Chloride (DARAN)**

DARAN products are emulsion polymerizations of 1,1-Dichloroethylene with other monomers such as acrylonitrile and various acrylates. Polyvinylidene chloride is made in glass lined or stainless steel reactors by semi-batchwise emulsion polymerization. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of methyl methacrylate, vinylidene chloride, acrylonitrile, and acrylic acid. DARAN is normally produced in four reactor trains (Reactors 200, 210, 220, and 230, with associated equipment).

**Emission Point 12: Developmental Processes (DMDNB)**

DMDNB is 2,3-Dimethyl 2,3-Dinitrobutane. DMDNB is produced in three steps: Production of 2-chloro-2-nitropropane, production of DMDNB in a methanol solvent and purification and drying. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of 2-nitropropane and methanol. DMDNB is normally produced in only one reactor train (Reactors 650 and 360, with associated equipment).

**Emission Point 13: Polyvinyl Acetate (PVA)**

PVA products are polyvinyl acetate emulsion polymers. PVA is made in a stainless steel reactor by batchwise and semi-batchwise emulsion polymerization. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of vinyl acetate and styrene. PVA is normally produced in one reactor train (Reactor 157 with associated equipment).

**Emission Points 14 and 15: Polyurethane (HYPOL)**

HYPOL products are foamable hydrophilic polyurethane prepolymers derived from toluene diisocyanate. HYPOL is made in stainless steel reactors by batchwise and semi-batchwise polymerization. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of 2,4-toluene diisocyanate (TDI). HYPOL is normally produced in two reactor trains (Reactors 450 and 460, with associated equipment).

**Emission Point 16: Raw Material Tank Storage Farm**

Hampshire Chemical has 21 large raw material storage tanks on the premises. For the purposes of this permit the losses from all of these tanks are combined into one emission point. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of methyl methacrylate, methanol, 2,4-toluene diisocyanate, vinylidene chloride, ethyl acrylate, styrene, acrylonitrile, vinyl acetate, and 2-nitropropane. Three of the tanks are subject to 401 KAR 63:005, *Standards of performance for new stationary sources*, incorporating by reference 40 CFR 60, Subpart Kb, *Standards of performance for volatile organic liquid storage vessels* (including petroleum liquid storage vessels) for which construction, reconstruction, or modification commenced

after July 23, 1984. The U. S. EPA's Office of Air Quality Planning and Standard's Emission Factor and Inventory Group's "Tanks" program, version 4.0 or later, is used to calculate working and breathing losses.

**COMMENTS:**

**(EMISSION POINTS 07 THROUGH 16)**

The major emissions from these processes are VOC and HAP emissions. These processes are not subject to a BACT or MACT.

**Emission Factors and Emissions Calculations:**

Potential emissions from the production of DAXAD, DARAN, HYPOL, PVA and DMDNB are calculated based on a Super Batch (see COPOL, above, for the derivation of a Super Batch).

**Emission Limits:**

To meet the provisions of 401 KAR 63:020, *Potentially hazardous matter or toxic substances* source-wide emissions must not produce emission concentrations at the site perimeter exceeding:

Methanol:	620 micrograms/cubic meter
Methyl methacrylate:	980 micrograms/cubic meter
Vinylidene chloride:	32 micrograms/cubic meter
Acrylonitrile:	2 micrograms/cubic meter
Acrylic acid:	1 microgram/cubic meter
2-Nitropropane:	20 micrograms/cubic meter
Vinyl acetate:	200 micrograms/cubic meter
Styrene:	1000 micrograms/cubic meter
2,4-Toluene diisocyanate:	.095 micrograms/cubic meter
Ethyl acrylate	48 micrograms/cubic meter

These pollutants are limited to the Reference Exposure Concentrations (RfC) derived by the U. S. EPA for these chemicals, or, in the case of chemicals for which the U. S. EPA has not developed an RfC, they are limited to the California Air Resources Board Reference Exposure Level. The Industrial Source Complex Short Term 3 (ISCST 3) modeling algorithm is accepted to demonstrate compliance with these limits.

**NOTE:** An RfC is "An estimate, derived by the U. S. EPA.....of a daily exposure to the human population,.....that is likely to be without appreciable risk of deleterious effects during a lifetime of exposure."

**Control Equipment:**

There is no required control equipment for these processes. However, Hampshire Chemical has voluntarily installed an AMTEK venturi water scrubber on both Reactors 450 and 460 in HYPOL process area (Emission Points 14 and 15). It removes TDI with a 99% efficiency. Hampshire Chemical has also voluntarily installed an AMTEK venturi water scrubber on tank V-410, which contains TDI in Raw Material Tank Storage Farm (Em Pt 16). It removes TDI with a 99% efficiency.

**EMISSION AND OPERATING CAPS DESCRIPTION:**

Emission limitations are detailed in the above section.

**OPERATIONAL FLEXIBILITY:**

This permit does not preclude Hampshire Chemical from cross-utilizing reactors or other equipment as business dictates. However, if a product is made using equipment not specifically described for that product in the permit, Hampshire must keep a record of how many batches of what products are made in which reactor trains. For each product, no matter which reactor train is used in its manufacture, all federally required air pollution control equipment must be used.

All finished product storage tanks are insignificant sources of pollutants. They are identified in the permit according to the products that they customarily contain. This does not preclude Hampshire from storing other products in the tanks to meet market requirements.

**CREDIBLE EVIDENCE:**

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.